

IMPACT: CROP YIELD

Reference 19

Mandal, D; Srivastava, P; Giri, N; Kaushal, R; Cerda, A; Alam, NM 2017 Reversing land degradation through grasses: a systematic meta-analysis in the Indian tropics SOLID EARTH, 8(1), 217-233. 10.5194/se-8-217-2017

Background and objective

In India most of the studies on the role of grasses as vegetative/filter strips have been done in isolation with fewer slope categories and with limited objectives restricted to soil erosion. We aim to synthesize and discuss the past scientific studies pertaining to the effect of grasses in arable and non-arable lands on one of the key determining soil processes, namely reduction in soil and water losses and enhancement of infiltration.

Search strategy and selection criteria

Information on the usefulness of grasses in soil and water conservation was collected from published literature. 1) Studies where both reference site (bare land/fallow land) and grass treatments were present; 2) The reference sites were adjacent to the grass-treated field/plots within the same landscape and similar slope. Therefore, studies where the reference site was either missing or was away from the study site were excluded.

Data and analysis

Data were analyzed using SPSS (version 17). The analysis of variance (ANOVA) was conducted to test the significant difference between different treatments. Initially, a t test was conducted to test whether the impacts of two treatments (without grass and with grass) were significantly different. Protected least significant difference (LSD) at $P = 0.05$ was used to separate the means for all the three different categories of data. A separate t test was also used for different slope classes to evaluate the performance of contour grass barriers on the reduction of soil and water loss and enhancing crop yield.

Number of papers	Population	Intervention	Comparator	Outcome	Quality score
25	Croplands in sloppy areas	Contour grass barrier	Without grass barrier	Metric: Crop yield; Effect size: Standardized difference of the considered metrics between intervention and control	50

Results

- The relative yield gained with contour grass barriers compared to no grass, varied between 44 and 53 %, depending on the slope.

Factors influencing effect sizes

- Slope : Highest value fro crop yields found in 2-4% slope.

Conclusion

The relative yield gained of various crops through contour grass barriers at different slopes varied between 44 and 53 %.